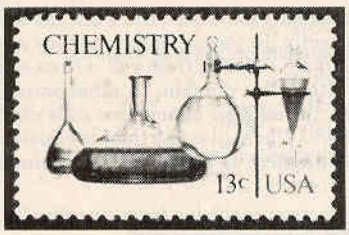

chemistry on stamps

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The Modern Metric System on Postage Stamps

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Many countries have issued postage stamps that display various aspects of the metric system. A theme that has generated a large number of stamps has been publicity for the adoption of the metric system by individual countries.[1,2] This includes stamps that have been issued either to commemorate the adoption of, or more recently to generate publicity for conversion to, the metric system. In addition to metric conversion stamps, there are stamps that celebrated the centenary of the International Meter Convention, which was held in Paris in 1875. This article will focus on the above three themes. However, other types of metric-related stamps have also been issued, including those that honor persons after whom metric units are named.[3] Many stamps have also been issued to commemorate standardization and World Standards Day in particular. These types of stamps will not be discussed here.

The International System of Units (SI)

What is commonly called the metric system has undergone many changes and improvements throughout history and is now called the International System of Units (SI). The name change took place in 1960 at the 11th General Conference on Weights and Measures. However, that is only one small event in the evolution of the metric system and its increasing use in the world.

The adoption of the metric system has been sporadic, taking place in vari-

[1] Schreck, J. O.; Lang, C. M. *J. Chem. Educ.* **1985,** *62,* 1041–1042.
[2] Schreck, J. O. *J. Chem. Educ.* **1986,** *63,* 283–287.
[3] Sokol, L. F. *U.S. Metric Assoc. Newsltr.* **1986,** *21*(4), 4.

ous stages of growth. The first stage of growth includes the initial development of the metric system as proposed by France near the end of the 18th century. Metric was eventually adopted by several countries in Europe and South America during the latter half of the 19th century. The process of adoption was slow, especially in France which saw the need to revise and improve the jumble of units being used throughout the country. The metric system was first officially proposed in 1791, but it was not made compulsory in France until 1840.[4] The metric system first spread to other European countries and also to many countries in South America. For those countries the adoption of the metric system took place over 100 years ago. Another surge in the acceptance of the metric system occurred following the end of World War II when the vast majority of British Commonwealth nations introduced metrication (metric conversion) programs.[5]

It was not until relatively recently that the first stamps related to the metric system were issued. France, in keeping with its leading role in metric, issued a stamp in 1954 (stamp no. 1) to commemorate the fact that the metric system was first introduced in France. However, the stamp was not issued until about 150 years after the fact. The stamp shows a symbolic measurement of a quadrant of the globe. The original definition of the meter[6] was a distance one 10-millionth of a quadrant of the Earth (from pole to equator) along a meridian passing through Paris.

Several stamps were issued to commemorate the adoption of the metric system by countries which did so in the latter half of the 19th century. The first two countries to recognize officially the centenary of the introduction of the metric system by issuing stamps were Mexico in 1957 (no. 2) and Brazil in 1962 (no. 3). The Mexican stamp shows three mass pieces (weights is a term that should be avoided), a meter stick, and the Earth on a starry background. The Brazil stamp shows part of a meter stick with its multiples of 10 to emphasize the decimal nature of the metric system.

Shortly afterward some European countries issued stamps to commemorate the centenary of their adoption of the metric system. In 1966 Romania issued two stamps. The first stamp (no. 4) again shows a quadrant of the Earth from which the meter was derived. The second stamp (no. 5) shows some symbols for metric units, including the now incorrect use of the degree kelvin (°K) rather than just kelvin (K).

In 1974 Jugoslavia issued a metric stamp (no. 6) showing a tape measure in the form of a large M for metric. Then in 1976 Hungary issued three metric stamps, two of which display artifacts used as standards by which the metric units were defined. The first stamp (no. 7) shows the standard meter bar, which is no longer used to define the meter. The second stamp (no. 8) shows the standard kilogram, which is the only metric unit still defined using an artifact. In 1960 the meter was redefined in terms of the wavelength of radiation emitted by a transition between certain electronic levels of the element krypton. This definition was made possible by the use of an interferometer as displayed in the third stamp (no. 9) issued by Hungary. This stamp also lists the seven SI base units.

The latest stamp (no. 10) to be issued to commemorate the introduction of the metric system was released by Finland in 1987. This stamp shows a decimeter cube and the X-shaped cross section of the meter bar. This X-shaped symbol will appear on other stamps. Other South American and European countries likewise adopted the metric system at an early stage, but not all countries chose to commemorate the fact on stamps.

30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52

[4] Nelson, R. A, *Phys. Teach.* **1981,** *19*(9) 596–613.

[5] Ritchie–Calder, L. *Sci. Amer.* **1970,** *223*(1), 17–25.

[6] Many stamps use the internationally preferred spelling of the words *metre* and *litre*; however, in the United States the common spellings are *meter* and *liter*.

International Meter Convention, Paris, 1875

The next major factor in the spread of the metric system was the International Meter Convention held in Paris in 1875. The resulting Treaty of the Meter was signed by representatives of 17 countries, including the United States. In 1975 many countries issued stamps to commemorate the centenary of the International Meter Convention. A total of 11 countries issued stamps, mainly European countries, many of which adopted the metric system about 100 years earlier, around the time of the Convention. However, some of the treaty-signing countries did not adopt the metric system until much later, especially countries outside of Europe and South America. The United States still has not adopted the metric system for use in everyday activities although a (voluntary) Metric Conversion Act was passed in 1975. This leaves the United States among a dwindling number of nations (including Burma and Liberia) that have not (at the time of writing) made a commitment to the metric system.

The stamps that commemorate the signing of the Treaty of the Meter include one issued by Switzerland (no. 11) showing the standard meter bar. The meter bar with its X-shaped cross section, although no longer used to define the meter, is a common symbol associated with the metric system. The Soviet Union chose to display metric unit symbols on its stamp (no. 12), again with a large M for the metric system. Bulgaria, in a manner similar to other stamps shown so far, displays the standard kilogram and meter bar on its stamp (no. 13). Romania, however, used a symbolic design, the Meter Convention emblem, on its stamp (no. 14). This was the second time Romania issued a stamp with a metric theme.

The next two countries that issued stamps in commemoration of the International Meter Convention are among those that did not adopt the metric system until much later in history. Indonesia kept tradition by showing the standard kilogram and meter bar on its stamp (no. 15). The world is also shown to emphasize that the metric system is international and is accepted by virtually the whole world. Korea again shows metric unit symbols on its stamp (no. 16) along with the familiar X-shaped cross section of the meter bar.

Norway issued a stamp commemorating the Meter Convention (no. 17) showing Ole Jacob Broch, first director of the International Bureau of Weights and Measures (BIPM). The BIPM, with headquarters in France, was established at the signing of the Treaty of the Meter. Sweden's metric stamp (no. 18) again shows a tape measure that seems to be in the form of a large M. France for the second time issued a metric stamp, this time to commemorate the Meter Convention. The stamp (no. 19) shows some of the signatures on the Treaty of the Meter along with a symbolic krypton-86 atom which was used to redefine the meter, a definition which has also been superceded. Surinam issued three commemorative stamps (nos. 20–22) all with the same symbolic design but with different colors and denominations. Finally, the Netherlands issued the last stamp (no. 23) in this series that commemorated the International Meter Convention.

More Recent Conversions to the Metric System

The latest phase in the adoption of, or conversion to, the metric system by the world is depicted in many stamps from various countries. Unlike the first set of stamps, these countries all converted to the metric system in the last 30 years, with most of the countries changing in the 1970's. Metric supporters call this the golden era, when metric spread rapidly around the world and was adopted by nearly the whole world. Publicity for the change to metric was a popular topic for stamps from many countries.

First among the recently converting countries is Japan, which issued a stamp in 1959 (no. 24) to publicize its adoption of the metric system. The stamp shows a tape measure, a balance, and a pharmacist's graduated cylinder symbolizing the measurements of length, mass, and volume. Korea in 1964 issued a stamp (no. 25) again showing metric tools and metric unit symbols for measurements of length, mass, and volume. Note the incorrect use of an uppercase letter in the symbol for kilogram.

The idea of using stamps to help educate and familiarize the public with the new metric units became a common theme for recent metric stamps. In 1971 Kenya, Uganda, and Tanzania together issued four metric stamps, each showing a quantity that is measured in metric. The first stamp (no. 26) shows a balance and the equivalency (at the Earth's surface) of the kilogram (a mass) with 2.2 lb (a force). The second stamp (no. 27) shows the use of a thermometer labeled incorrectly in centigrade (the correct terminology is degree Celsius). The third stamp (no. 28) has a volume theme in which petrol (gasoline) is measured in liters. The fourth stamp (no.

Identification and Description of Stamps

Stamp No.	Issuing Country	Year of Issue	Scott Catalog No.
1	France	1954	732
2	Mexico	1957	C241
3	Brazil	1962	940
4	Romania	1966	1873
5	Romania	1966	1874
6	Jugoslavia	1974	1180
7	Hungary	1976	2418
8	Hungary	1976	2419
9	Hungary	1976	2420
10	Finland	1987	750
11	Switzerland	1975	599
12	Soviet Union	1975	4304
13	Bulgaria	1975	2236
14	Romania	1975	2547
15	Indonesia	1975	941
16	Korea	1975	975
17	Norway	1975	655
18	Sweden	1975	1121
19	France	1975	1435
20	Surinam	1975	421
21	Surinam	1975	422
22	Surinam	1975	423
23	Netherlands	1975	531
24	Japan	1959	673
25	Korea	1964	428
26	Kenya, Uganda, Tanzania	1971	225
27	Kenya, Uganda, Tanzania	1971	226
28	Kenya, Uganda, Tanzania	1971	227
29	Kenya, Uganda, Tanzania	1971	228
30	Malawi	1971	161
31	Malawi	1971	162
32	Malawi	1971	163
33	Malawi	1971	164
34	Australia	1973	541
35	Australia	1973	542
36	Australia	1973	543
37	Australia	1973	544
38	Pakistan	1974	364
39	Tonga	1975	449
40	Ghana	1976	570
41	Ghana	1976	571
42	Ghana	1976	572
43	Ghana	1976	573
44	New Zealand	1976	594
45	South Africa	1977	497
46	Cuba	1977	—[a]
47	Singapore	1979	316
48	Singapore	1979	317
49	Singapore	1979	318
50	Bangladesh	1983	212
51	Bangladesh	1983	213
52a–f	Guyana	1982	338a–f

[a] Scott No. is not available; Yvett No. is 2039.

29) has a length theme and shows surveyors determining length by triangulation.

Related to and preceding metric conversion in many countries was the introduction of decimal currency and coins. Although many countries have undergone this process, only one country is known to have issued stamps to publicize the conversion to decimal currency. In 1971 Malawi issued four stamps (nos. 30–33) showing their new coins, which are in the preferred multiples of 1, 2, and 5 units. Prior to conversion Malawi used a British form of pounds, shillings, and pence. Conversion to decimal currency has also taken place in the Republic of South Africa, Australia, and New Zealand (for example) prior to their adoption of the metric system. All of these countries adopted the 1–2–5 series for their coins and banknotes, with a 20-cent coin, rather than the 25-cent coin used in the United States.

Australia, in its 1973 publicity campaign for metric conversion, chose a humorous theme for the metric units. The stamps show typical values in both old units and new metric units for mass (no. 34), length (no. 35), temperature (no. 36), and volume (no. 37). Pakistan in 1974 again used basic measuring tools on its stamp (no. 38) to show mass, volume, and length. Tonga with its self-sticking and oddly-shaped stamp (no. 39) again used a giant M to represent metric conversion. Ghana, like Kenya and Australia, chose to educate the public on its metric stamps. Each of the four stamps issued in 1976 shows equivalent measurements in both old units and new metric units. The first stamp (no. 40) shows equivalent volumes in milk containers. The second stamp (no. 41) shows a balance and the equivalence between old and new metric units. The third stamp (no. 42) displays length of material, and the fourth stamp (no. 43) shows the two temperatures that are used to define the Celsius temperature scale.

New Zealand was less flamboyant about its publicity for metric conversion, and its stamp (no. 44) shows a symbolic design that is the logo for its conversion program. The intent was to symbolize a stylized letter M for metric. South Africa, however, again shows the world and a giant M for metric on its stamp (no. 45). This stamp includes the symbol SI for the International System of Units, with South Africa claiming to be a world leader in the adoption of SI units, as opposed to older metric units. In 1977 Cuba issued a metric stamp (no. 46) that shows a map of Cuba and lists the seven SI units over a colorful rainbowlike background. Singapore followed in 1979 with three metric stamps, the first two of which have a length theme. The first stamp (no. 47) gives an example of larger distances by showing a metric road sign in kilometers. The second stamp (no. 48) illustrates smaller distances using a tape measure marked in centimeters. The third stamp (no. 49) shows a mass scale calibrated in kilograms.

The two most recent metric stamps were issued in 1983 by Bangladesh. The first stamp (no. 50) shows a scale, and the second stamp (no. 51) shows tools used to measure mass, volume, and length. The largest number of metric stamps issued at one time is six. This sheet of stamps (no. 52a–f) was issued by Guyana in 1982 to publicize its conversion to the metric system. The individual stamps show (1) a tape measure, (2) a juggler with metric unit symbols, (3) an envelope, signifying postal metrication, (4) a scale, (5) a bridge, and (6) a liter bucket.

Summary

A table lists each of the postage stamps in the order of their discussion in this article. The stamps tell a brief but interesting history of the metric system and its adoption by virtually all countries of the world. The stamps display many measurement tools and devices, as well as artifacts used to define the metric units. Many stamps also served an educational role in teaching the public about the metric system as well as publicizing the conversion to metric in numerous countries. If anyone knows of additional metric-related stamps or articles about metric stamps, the authors would appreciate learning about them.

Acknowledgment

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